

Future water supply is growing concern in Congress

Recent droughts and reports indicating that climate change and a growing population could lead to future water shortages have captured U.S. lawmakers' attention and prompted a number of bills aimed at increasing water use efficiency and water supply.

HR 6997 The National Water Research and Development Initiative Act

In July, WRRI Acting Director Upton Hatch testified before the House Science and Technology Subcommittee on Energy and Environment on draft legislation to improve research and technology transfer to increase water supply through greater efficiency and conservation. Testifying as president-elect of the National Institutes for Water Resources, Hatch told the subcommittee that "Demands for water resources to support population and economic growth continue to increase, although water supplies to support this growth are fixed and already fully allocated in most areas.

"North Carolina, as well as most U.S. regions, is not well prepared to effectively manage these unprecedented water stresses," he said, "because of—among other things—insufficient federal and state research investments for the development and implementation of innovative, adaptive and integrated management technologies, systems and processes."

The legislation under consideration—which has since been passed by the House and now sits in the Senate Committee on Environment and Public Works—is aimed at coordinating and improving federal water research. It would create an inter-agency committee with jurisdiction over water to better coordinate research efforts across 20 federal agencies. The committee would be overseen by the White House

Office of Science and Technology Policy and would be charged with creating a plan to shore up federal research efforts on water. The White House would be required to submit budget guidelines for implementing the plan.

HR 3957 the Water Use Efficiency and Conservation Research Act

The House has also passed and sent to the Senate a bill that would institute an R&D program within the Environmental Protection Agency's Office of Research and Development to promote the efficiency and conservation of water. Included are technologies and processes that enable the collection, storage, treatment, and reuse of rainwater, stormwater, and graywater; water storage and distribution systems; behavioral, social, and economic barriers to achieving greater water use efficiency; and use of watershed planning directed toward water quality, conservation, and supply.

The bill would also require EPA to enter into an arrangement with the National Academy of Sciences to complete a study of low impact (managing rainfall

at the source) and soft path (integration of water supply, wastewater treatment and stormwater management; increased water use efficiency; and effective use of ecosystems to provide clean water) strategies for management of water supply, wastewater, and stormwater.

HR 2339 The Produced Water Utilization Act

Also passed by the House is a bill that would establish a program to research, develop, and demonstrate the beneficial reuse of water produced in connection with oil and gas extraction. According to the bill report, as much as 2.3 billion gallons per day of "produced water" is generated by the domestic oil and gas industry. Produced water frequently contains high levels of potentially harmful dissolved solids, as well as low levels of hydrocarbons, rendering much of the water non-potable and unsuitable for agricultural or industrial uses.

Disposing of produced water is costly and may be discouraging domestic energy production. The bill requires the Secretary

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of Energy to carry out a program of research, development, and demonstration of technologies for environmentally sustainable utilization of produced water for agricultural, irrigational, municipal, and industrial uses, or other environmentally sustainable purposes. The program will focus on three areas as well as improving safety and minimizing environmental impacts in areas that deal with produced water recovery. The three areas are (1) Produced water recovery, including research for desalination and demineralization to reduce total dissolved solids in the produced water; (2) Produced water utilization for agricultural, irrigation, municipal, or industrial uses, or other environmentally sustainable purposes; and (3) Re-injection of produced water into subsurface geological formations to increase energy production.

Moreau steps down as WRRRI director again

At the end of June, Dr. David H. Moreau stepped down as director of WRRRI—for the second time. He previously served as director from 1982 to 1995 and returned in 2005 to lead the institute while university officials sought a new director.

Moreau's return to WRRRI just at the time when he was to begin phased retirement as Professor at UNC-Chapel Hill is an example of what has defined his career—an uncommon dedication to applying science to address real-world water problems.

The water community in North Carolina knows Moreau for his research and writing on the state's water resources and mentoring of scores of UNC-Chapel Hill graduate students in planning and environmental engineering; as director of WRRRI and founder of its Urban Water Consortium; as the longest-serving chairman of the N.C. Environmental Management Commission and one of the longest-serving members of the N.C. Sedimentation Control Commission; and as advisor to governors and the General Assembly.

But, Moreau is known far beyond North Carolina. He is nationally recognized and regarded not only for his research and writing, but also for his service on National Research Council committees charged with applying science to water problems in New Orleans after hurricane Katrina, in the Pittsburgh Region, in the Florida Everglades, in the Great Lakes, in the Mississippi, and in New York City. He has also served as officer of two national organizations that encourage federal support for research on water issues. Internationally, he has served as a consultant on irrigation in Jamaica; on potable water and sanitation in Buenos Aires, Argentina; on water management models in Beijing, China; and on financing water supply and waste disposal for USAID.

The "Retirement" Celebration

Moreau's service and contributions were celebrated in June with a "retirement" party at the NCSU University Club.

Bill Holman (former N.C. Secretary of Environment and Natural Resources and current Duke University policy researcher) lauded Moreau for his "willingness to engage in not only the science of environmental management but also the messy economics and politics of environmental management—from reducing pollution in the Neuse River, to developing stormwater rules, to reducing air pollution from coal-fired power plants to regulating swine operations."

John Gilligan (former NCSU Vice Chancellor for Research and Graduate Studies) said, "We have many water-related academic engineers and scientists on our campuses, but it has been you that has brought them together to attack real world problems."

Duke University Professor Ken Reckhow who "succeeded and preceded" Moreau as WRRRI Director, credited him with establishing WRRRI as the "model water institute in the United States, based on an assessment by the U.S. Geological Survey."

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Dr. Moreau with his wife, Polly, receiving the Order of the Long Leaf Pine, from DENR Secretary Bill Ross.

In recognition of his unparalleled service to North Carolina, N.C. Secretary of Environment and Natural Resources Bill Ross—on behalf of Governor Mike Easley—presented Moreau the Order of the Long Leaf Pine. The award is the highest honor the governor can bestow on a North Carolina citizen.

Reflections

When Moreau stepped down as WRI director in 1995, he said that the most pressing water issues for North Carolina were groundwater management and watershed protection. Today, he said, he thinks the state has made real strides in groundwater protection with implementation of the Central Coastal Plain Capacity Use Area rules. He also said that the legislature made a strong move to protect drinking water wells in 2005 with the passage of House Bill 2873 which requires all counties to have a well permitting, inspection, and testing program.

However, Moreau thinks the state has not made a lot of progress on watershed protection since 1995. Watershed

rules implemented in the early 1990s were a first step but apply only to new development. “Those rules just hold down the increase in future pollutant loading from stormwater runoff. They do nothing to reduce existing loading,” he said. Retrofitting of existing development with stormwater controls, which is part of the contested Jordan Lake rules, he said, would be a step forward. “But, retrofitting is very controversial, and there is a question as to whether that will survive legislative review. However, we have clearly made advances in our ability to manage stormwater,” he said. “The combination of state regulations and local initiatives—notably stormwater utilities—has produced some very sophisticated stormwater management in this state.”

At the end of his first tenure at WRI in 1995, Moreau had predicted increasing competition for the state’s water resources. As chairman of the EMC, he has been in a unique position to see that projection come to pass. “Two things came together to galvanize interest in water availability. First, the decision on the Kannapolis/Concord interbasin transfer (IBT) led the legislature to rewrite the law in a way that made IBTs slightly more difficult and gave greater protection to resources within a basin. Then the droughts of 2001-2 and 2007-8 led to legislation that directed the General Assembly’s Environmental Review Commission to conduct review of the overall management of water resources and make recommendations on any changes needed.”

“The key issue is whether we need some kind of statewide water withdrawal permit system. I would hope that any withdrawal permitting would be tied into more systematic river basin planning. The Division of Water Resources can point with pride to advances in their capability to analyze the effects of growth on river basins. What remains to be done is to produce a set of planning documents on a regular schedule like our basinwide water quality plans. Current basinwide water resource plans were done largely in the context of hydropower relicensing and the Cary/Apex IBT, but we need regular assessments and reassessments of all river basins.”

Real Retirement

Moreau won’t be playing much golf in retirement. “If my golf game was any good, I might be inclined to play more, but why beat yourself up to do something you’re no good at, at the expense of something you are good at.” Instead, he’ll continue to serve as a member of the Water Science and Technology Board of the National Research Council, will serve a second term on an independent review panel set up to track progress on restoration of the Everglades, and will serve as chairman of an Environmental Protection Agency panel charged with determining next steps to reduce hypoxia in the Gulf of Mexico.

In addition, he has received a grant from the Clean Water Management Trust Fund to conduct a review of potential reservoir sites in North Carolina. While the project focuses on water supply, he says we need to look at demand management as well. “I’m told our current water reuse rules are a barrier to reuse, but I’ve not heard very specific comments on that issue that need the attention of the EMC. Also, North Carolina is far behind western states in terms of water efficiency, and we need to be more aggressive in conserving through efficiency. Restructuring of water rates to use price as an influence on demand, while politically unpopular, is one way to improve efficiency.”

Moreau speaks with some passion about water efficiency and is involved in some “behind the scenes” efforts on that issue. So, with all the work he’s got lined up, what does retirement mean to Dr. David Moreau? “I won’t be driving from Chapel Hill to Raleigh three days a week, and I won’t be dealing with administrative matters.”

Environmental legislation passed by the 2008 session of the N.C. General Assembly

For detailed provisions of bills please use the links to bills on the General Assembly website.

HB 1889 PROVIDE PROPERTY TAX RELIEF FOR QUALIFYING WILDLIFE CONSERVATION LAND, CLARIFY THE PRESENT-USE VALUATION OF PROPERTY SUBJECT TO A CONSERVATION EASEMENT, AND PROVIDE A PROPERTY TAX EXEMPTION FOR LEASEHOLD INTEREST IN CERTAIN EXEMPTED PROPERTY.

<http://www.ncga.state.nc.us/Sessions/2007/Bills/House/HTML/H1889v8.html>

HB 2353 AUTHORIZE THE LICENSURE OF IRRIGATION CONTRACTORS etc.

<http://www.ncga.state.nc.us/Sessions/2007/Bills/House/HTML/H2353v6.html>

Creates the NC. Irrigation Contractors Licensing Board and provides that “no person shall engage in the practice of irrigation construction or contracting, use the designation ‘irrigation contractor’ or advertise using any title or description that implies licensure” unless licensed by the board. Exemptions are many (landscape architects, professional engineers, homeowners installing on their own property, agricultural irrigation, irrigation construction costing less than \$2,500, and others) so that, essentially, licensing is required only of those without other professional license who install landscape irrigation systems costing more than \$2,500 at residences not their own.

HB 2431 STUDIES BILL

<http://www.ncga.state.nc.us/Sessions/2007/Bills/House/HTML/H2431v4.html>

The Legislative Research Commission, Joint Legislative Transportation Oversight Committee, and Environmental Review Commission *may* study a number of issues. See bill text.

The Joint Select Committee on Emergency Preparedness and Disaster Management Recovery is extended and *shall* study issues related to emergency preparedness and disaster management recovery, including: ❖ Adequacy of code addressing commercial and residential construction in hurricane and flood prone areas, ❖ The public health infrastructure in place to respond to natural and nonnatural disasters, including pandemic flu preparation and response, ❖ Hurricane preparedness, evacuation, and response, ❖ Energy security, ❖ Bioterrorism preparedness and response, ❖ Flood and natural disaster preparation and response.

The Legislative Study Commission on Urban Growth and Infrastructure Issues is created and *shall* study: ❖ Options for fostering regional planning for water and transportation infrastructure. ❖ Strategies (including additional local land use regulatory tools) for encouraging the use of incentive-based planning by urban area local governments. ❖ Strategies to help urban communities maximize the benefits of growth and cope with the challenges presented by rapid growth in population, school enrollment, vehicle miles traveled on urban roads and highways, and related demands for other public services while preserving a viable economic climate and building greater regional cooperation.

HB 2496 AUTHORIZE ADDITION OF BEAR PAW STATE NATURAL AREA (on Avery and Watauga County line) AND YELLOW MOUNTAIN STATE NATURAL AREA (Avery and Mitchell County) TO THE STATE PARKS SYSTEM

<http://www.ncga.state.nc.us/Sessions/2007/Bills/House/HTML/H2496v3.html>

HB 2499 IMPROVE DROUGHT PREPAREDNESS AND RESPONSE IN NORTH CAROLINA

<http://www.ncga.state.nc.us/Sessions/2007/Bills/House/HTML/H2499v6.html>

Among the provisions are: Provides that the N.C. Dept of Agriculture shall annually collect data on agricultural irrigation of more than 10,000 gallons per day and report aggregate data to the Environmental Review Commission and Dept. Environment and Natural Resources each July. Moves water emergency response authority from the Environmental Management Commission to the Secretary of DENR. Requires public water providers to develop water conservation measures for drought that satisfy specific requirements, including tiered levels of conservation based on severity of drought or water shortage. Gives DENR authority to require more stringent drought response measures under specific circumstances. Sets forth water efficiency requirements for public water systems asking for state funding including leak detection and repair and separate metering for new in-ground irrigation systems. Directs the EMC to adopt rules to promote safe and beneficial use of treated wastewater. Provides that homeowners covenants registered prior to Oct 1, 2008, cannot be construed to require landscape irrigation during severe, extreme or exceptional drought unless the covenant specifically requires irrigation in spite of conservation measures imposed by the state or local government. Prohibits homeowners associations from

Environmental legislation *continued from page 4*

penalizing landowners for not complying with requirements to irrigate during droughts unless the covenant authorizes the fines or other penalties. Covenants registered after Oct 1, 2008, must provide for suspension of landscape irrigation requirements when state or local authorities have imposed water conservation measures that prohibit irrigation. Unless covenants registered after Oct 1, 2008, specifically provide for fines for violating irrigation requirements on the first page of the covenant in large, boldface, capital letters, fines are prohibited.

HB 2788 APPOINT PERSONS TO VARIOUS PUBLIC OFFICES

<http://www.ncga.state.nc.us/Sessions/2007/Bills/House/HTML/H2788v5.html>

Lorance "Rance" Henderson of Burke County and Kevin W. Markham of Wake County to the Clean Water Management Trust Fund Board of Trustees. Donnie W. Brewer of Pitt County to the Environmental Management Commission. Jeffrey A. Knight of Union County to the North Carolina On-Site Wastewater Contractors and Inspections Certification Board. Edward W. Wood of New Hanover County, Michael Allen, Ph.D., of Mecklenburg County, Walt Israel of Gaston County, and Cynthia Tart of Brunswick County to the North Carolina Parks and Recreation. Jeffrey Starkweather of Chatham County to the North Carolina Petroleum Underground Storage Tank Funds Council. Curtis B. Venable of Buncombe County and the Honorable John B. Lewis Jr., of Pitt County to the Rules Review Commission.

SB 1885 PROMOTE COMPENSATORY MITIGATION BY PRIVATE MITIGATION BANKS

<http://www.ncga.state.nc.us/Sessions/2007/Bills/Senate/HTML/S1885v4.html>

Provides that anyone, other than DOT, who must do compensatory wetlands mitigation cannot satisfy the requirement by paying into the Ecosystem Restoration Fund if a private wetlands mitigation bank satisfying certain criteria is available in the same 8-digit hydrologic unit.

N.C. Division of Water Quality issues technical guidance on stormwater treatment credit for rainwater harvesting systems

It is the policy of the N.C. Division of Water Quality to enable and encourage the use of rooftop rainwater harvesting systems (cisterns) to reduce stormwater runoff pollution from an individual site. Collecting and storing rooftop runoff, and providing a consistent, dedicated, and reliable end use, will reduce the volume of runoff and enable the reduction in size of other required stormwater treatment systems on the site. In watersheds requiring nutrient removal from stormwater, dedicated uses of the collected rainwater or proper treatment/infiltration can reduce stormwater nutrient removal requirements. DWQ has issued technical guidance that establishes the credit that will be allowed in DWQ permitting programs that consider impervious built-upon areas (BUA) and that rely on calculations of runoff volume and peak flow for sizing stormwater Best Management Practices (BMPs).

The guidance can be found at: http://h2o.enr.state.nc.us/su/documents/RainwaterHarvesting_Approved.pdf

N.C. Division of Water Quality extends general permit for stormwater from construction sites

In September, the N.C. Division of Water Quality announced that it was extending the effective date of the existing, expired NPDES General Permit No. NCG010000 for stormwater point source discharges associated with construction to June 30, 2009, or until such prior time as the draft permit is finalized.

The Division has noticed its intent to reissue a revised version of this permit with changes in conditions and administration processes. The text of the draft NPDES General Permit NCG010000 and the associated fact sheets are to be available on and after October 15, 2008, at the Stormwater Permitting Unit website at <http://h2o.enr.state.nc.us/su/index.htm>

Written comments regarding the draft permit NCG010000 will be accepted until December 1, 2008. Comments may be submitted by email to ken.pickle@ncmail.net or by mail to Ken Pickle, Wetlands and Stormwater Branch, N.C. Division of Water Quality, 1617 Mail Service Center, Raleigh, North Carolina 27699-1617.

July Action of the Environmental Management Commission

On July 9, the N.C. Environmental Management Commission's (EMC) standing committees held regular meetings and took the following actions:

Water Allocation Committee

- Heard an update on the status of the Western Wake Regional Wastewater Management Facility (WWRWMF).

The interbasin transfer (IBT) certificate issued by the EMC allowing the Town of Cary to take water from Jordan Lake in the Cape Fear River Basin and discharge it to the Neuse River Basin requires that Cary construct a wastewater treatment plant to return a portion of the transferred water to the Haw River or Cape Fear River by 2010. Cary, Apex, Morrisville, and Wake County are cooperating to build a regional wastewater facility to meet the requirement.

Bill Kreutzberger of CH2MHill, the project consultant, told the Water Allocation Committee that the current project plan and schedule provide for the wastewater facility to begin operation in 2013—three years later than required in the IBT certificate. However, Kreutzberger said that Cary has an agreement with Durham, which has a discharge to the Cape Fear Basin, to treat some wastewater and has a water reuse program that will retain water in the Cape Fear Basin. These measures will allow Cary to comply with the average-day return requirement by 2011. He said that meeting the maximum day return requirement, however, may necessitate additional measures, such as purchasing water from the Neuse Basin, or may make it necessary to ask for a modification of the IBT certificate.

Kreutzberger also told the committee that a final decision on the discharge point for the new facility has not been made and that the partners are now considering the possibility of discharging to Harris Lake, from which Progress Energy draws cooling water for the Shearon Harris nuclear plant. The possibility that Progress Energy will expand the nuclear plant and install lines to withdraw additional cooling water from the Cape Fear, prompted discussions about moving the discharge point for the WWRWMF to Harris Lake to avoid the costs of duplicate infrastructure. Kreutzberger said that modeling is now being done to determine whether the discharge would lead to nutrient overloading of the lake. He also said that with the Harris Lake discharge option, the maximum day return requirement might not ever be met under current rules and might require an IBT certificate modification.

EMC chairman David Moreau expressed confusion about when the question of the discharge point would be resolved. "We don't want to force an inefficient solution, but there comes a time to move forward," he said. He requested a timetable for resolution of the discharge question and said that the staff of DWQ should take a "why not" position on

the Harris discharge and expedite modeling. "We can make an IBT modification in short order if water quality is not an issue," he said.

Kreutzberger said that a feasibility assessment of the Harris discharge could possibly be ready for the September meeting of the committee.

- Heard updates on upcoming interbasin transfer requests.
 - ❖ Phil Fragapane of the Division of Water Resources told the committee that the Greenville Utilities Commission is planning to begin selling water to several communities outside the Tar River Basin that must reduce groundwater withdrawals due to the Central Coastal Plain Capacity Use Area rules. A draft environmental assessment on this project is currently under revision.
 - ❖ The Lower Cape Fear Water and Sewer Authority (Brunswick County) expects that by 2012 its sales to several beach communities outside the Cape Fear Basin will exceed the amount currently grandfathered. Preparations to request an IBT certificate for additional transfers are just getting underway.
 - ❖ The Kerr Lake Regional Water System is expected to request an IBT certificate for sales to communities outside the Roanoke River Basin. Noting that other communities (including Raleigh) have expressed interest in getting water from Kerr Lake, Chairman David Moreau said that the EMC needs to understand the long-term feasibility of withdrawing water from Kerr Lake before granting any IBT certificates. "We need a longer view if we're going to open up that can of worms," said Moreau.

Water Quality Committee

- Approved recommending to the EMC reclassification of a portion of the Haw River in Chatham County to Water Supply IV. The reclassification will apply to an existing use by the town of Pittsboro, which has already implemented a Water Supply Watershed Protection ordinance for the area. DWQ staffer Elizabeth Kountis said it is unclear how Pittsboro installed a water supply intake without first asking for reclassification, but the action will bring the use "up to code."
- Approved recommending to the EMC that enforcement be initiated on the City of Raleigh for failure to implement a watershed protection ordinance for a portion of the upper Neuse River/Richland Creek. (Discussion of this item is in the report on EMC action.)
- Heard a report on NPDES Phase II and Universal Stormwater program delegations in the last year. Kure Beach has adopted and Emerald Isle, Ahoskie, and Surf City

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are preparing Universal Stormwater program ordinances; Buncombe County will receive Phase II delegation when it adopts a compliant ordinance. Guilford County and Gaston County already have Phase II delegation.

- Heard a report on the draft Neuse River Basinwide Water Quality Plan and an update on the Neuse River Nutrient Sensitive Waters Management Strategy. DWQ staffer Nora Deamer said that comments on the basinwide plan were to be due August 1, but that the City of Raleigh requested an extension of the comment period and presentation of the final plan may be delayed until the November EMC meeting. The draft plan can be found at <http://h2o.enr.state.nc.us/basinwide/Neuse/2008/NeuseRiverBasinPlanDRAFT.htm>.

According to the draft plan:

- ❖ The majority of fresh and saltwater acres in the basin have elevated chlorophyll a, nutrients, turbidity and fecal coliform levels. The majority of stream miles have elevated turbidity and fecal coliform levels, as well as low dissolved oxygen. Of the total monitored, 13.6% of freshwater miles, 75.6% of freshwater acres, 24.6% of saltwater miles, and 15.5% of saltwater acres are impaired for one or more uses. Stormwater from a variety of land uses is the primary source of impairment.
- ❖ The Nutrient Management Strategy Plan goal of a 30% reduction in total nitrogen loading at Fort Barnwell has not been achieved. Chlorophyll a standard violations have expanded farther down stream into the estuary, and, because of elevated phytoplankton productivity, a large part of the estuary is now in violation of the pH standard. Additional reductions of total nitrogen are likely needed from land uses not adequately addressed by the original rules, such as stormwater retrofits on existing development and better stormwater controls on new development throughout the basin.
- ❖ The freshwater portion and upper portion of the estuary have seen improvement in chlorophyll a standard violations and have been removed from the impaired waters list.
- ❖ Twenty-seven miles of the Nahunta Swamp and 15.4 miles of Core Creek have seen improvement in the macroinvertebrate community and have been removed from the list of impaired waters.
- ❖ Sections of Falls Lake are impaired due to chlorophyll a and turbidity standard violations. DWQ is developing a lake and watershed model to support development of a nutrient management strategy for Falls Lake, as required by legislative mandate. According to John Huisman, the watershed model is to be completed by August 2008 and the lake model by January 2009. Rules to implement a management strategy are expected to be presented to the EMC by summer 2010. A stakeholder process will be conducted beginning in August 2008 and continuing through May 2009. The management strategy will ultimately require reductions in nutrients and sedimentation from all sources in the watershed.
- ❖ More than 28,000 acres of shellfish waters in the estuary are impaired due to fecal coliform bacteria standard violations. Better stormwater control and pet waste management are needed to improve shellfish waters.
- ❖ All waters of the Neuse (as all waters in North Carolina) are impaired by mercury, and citizens are advised not to eat largemouth bass. Consumption advisories on other species of fish have also been issued (see <http://www.epi.state.nc.us/epi/fish/index.html>).

On July 10, the EMC took the following action:

- Approved proceeding to public hearing on changes to air quality rule 15A NCAC 02Q .0207 to include greenhouse gases (including carbon dioxide, particulate matter 2.5, methane, nitrous oxide and others) in annual emissions reporting required of Title V facilities. The draft rule can be found at <http://daq.state.nc.us/rules/draft/Q0207.pdf>
- Approved proceeding to public hearing on changes to air toxics rule 15A NCAC 02Q .0701 to address the combustion source exemption. The draft rule can be found at <http://daq.state.nc.us/rules/draft/section0700.pdf>.
- Approved proceeding to public hearing on a new rule (15A NCAC 02D .1808) to address odors from new or modified swine farms. The rule will codify a 2007 session law. The draft rule can be found at <http://daq.state.nc.us/rules/draft/D1808.pdf>
- Approved proceeding to public hearing on rule 15A NCAC 02T .1304 which will set performance standards for new and expanding swine waste systems. The rule will codify requirements of a 2007 session law. It can be downloaded at <http://h2o.enr.state.nc.us/aps/afou/downloads.htm>.
- Approved initiating enforcement on the City of Raleigh for failure to implement a watershed protection ordinance for the Upper Neuse River/ Richland Creek water supply watershed. With four members recusing themselves because of ties to the City of Raleigh, and with the vice chairman both making the motion and presenting the argument against it, it was clear that the commission was sympathetic to the situation the City of Raleigh found itself in but was determined to protect the integrity of the water supply watershed protection program. The genesis of the problem was a request by the Town of Wake Forest that resulted in a reclassification of the Upper Neuse River, Richland Creek and unnamed tributary streams in Wake County from Class C NSW to Water Supply IV NSW in 2004. Wake Forest had intended to draw water from the Neuse for municipal supply but subsequently abandoned that plan and merged its water supply system with the

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City of Raleigh. To avoid additional land use restrictions in the designated areas, the City of Raleigh requested a reclassification back to Class C NSW. However, Franklin County then expressed interest in using the intake site for water supply, and the reclassification request was denied. Raleigh appealed the decision but lost the appeal. According to the water supply watershed rules, Raleigh should have adopted a watershed protection ordinance within 270 days after reclassification. However, four years after the initial reclassification, no ordinance has been adopted. Raleigh had proposed an ordinance but met heavy public resistance because it exceeded state minimum standards and because Franklin County had not moved to use the Neuse River intake (aside from a feasibility study). Raleigh had communicated to DWQ staff its intention to propose an ordinance based on state minimums and proposed a timeline for adopting the ordinance. However, the commission decided Raleigh had had enough time to adopt the required ordinance and voted to “start the clock” on the maximum 365 days that the city has to adopt an ordinance before the state assumes responsibility for administering the program in the subject watershed and begins fining the city.

Commissioner Forrest Westall noted that the Water Supply

Watershed Protection program has been in place 16 years and that this is the first case of noncompliance with the rules. He said that how the commission deals with this noncompliance will communicate to other local governments the importance of the program. “There have been contentious reclassifications before—the North Toe and Ivy River,” he said, “but we’re responsible for enforcing this program.”

- Agreed with DWQ staff recommendations for dealing with the Rules Review Commission’s (RRC) objections to the Jordan Reservoir Water Supply Nutrient Strategy. The commission adopted rule revisions to address a lengthy set of technical changes and made a request for a full review of the rules at the July 17 meeting of the RRC. Responses to substantive objections will be recommended to the EMC at its September meeting in time to be considered by the RRC at its September meeting. It is staff’s intention to get the rules before the 2009 General Assembly so that they can be implemented in 2009.
- Received the interim report of the Division of Air Quality on the control of mercury emissions from coal-fired electric steam generating units. The report can be found at <http://h2o.enr.state.nc.us/admin/emc/documents/AttachmentAtoInfoItem08-03HgReport.pdf>

WRRRI receives Royal Bank of Canada Blue Water Project Grant

In connection with the grand opening of the Royal Bank of Canada (RBC) Plaza in Raleigh in October, CEO Gordon Nixon announced that the Water Resources Research Institute of The University of North Carolina is a recipient of a 2008 Blue Water Project leadership grant.

RBC’s Blue Water Project is a 10-year, C\$50 million global philanthropic commitment to projects that help protect freshwater. Launched in late 2007, the project is aimed at fostering a culture of water stewardship in Canada and abroad. To date, RBC has committed almost C\$13 million in grants to 39 organizations globally.

WRRRI will receive a grant of \$200,000 to fund an outreach program to educate elected officials and community leaders in North Carolina about water management issues in this quickly growing region that suffers from limited opportunities to develop new water resources. The N.C. League of Municipalities will cooperate in carrying out the program.

Also receiving 2008 Blue Water Project grants are the Alabama Coastal Foundation, Donors Choose, Friends of the Mississippi River, and the World Wildlife Fund.

Applications for the next round of Leadership Grants are due on March 6, 2009. Applications for Community Action Grants, ranging from \$1,000 to \$5,000, are accepted year-round. Community Action Grants help support programs and projects devoted to informing, educating and mobilizing people about watershed protection at the community level. Information on grants is available at <http://www.rbc.com/environment/bluewater/index.html>

September Action of the EMC

The N.C. Environmental Management Commission met September 10, 2008, and its committees met September 9. The following action was taken:

Water Quality Committee

- Approved a major variance from the Neuse River basin riparian buffer protection rules for the Caswell Center, a facility providing services and residence to individuals with mental retardation, in Kinston.
- Approved asking the full EMC for permission to hold public hearings on reclassification of a section of the Dan River in Caswell County for drinking water supply (WS IV). Half of the area to be protected under the Water Supply Watershed Protection rules is in Virginia, and the Division of Environmental Health has said that this source is not the most appropriate one for the applicant (Roxboro).
- Removed from the agenda a request from PCS Phosphate Company, Inc. for a major variance from the Tar-Pamlico riparian buffer rules for a mine continuation in Beaufort County. EMC counsel Frank Crawley told the committee that there is potential for litigation on the variance and warned against ex parte communication.
- Approved waiving the “30-day rule” and proceeding to the full EMC the next day with a request to hold public hearings on changes to rules governing the use of reclaimed water (NCAC 02T .0900). House bill 2499 (SL 2008-143) passed by the last session of the General Assembly, directs the EMC to “encourage and promote safe and beneficial reuse of treated wastewater.” The EMC is to: identify acceptable uses of reclaimed water, facilitate permitting of reclaimed water systems, and establish standards for reclaimed water systems that will prevent distribution of reclaimed water as potable water. The rule changes would add to the “deemed permitted uses” the following: reclaimed water supplied through a bulk distribution systems, residential irrigation systems approved by the local building inspector, and conjunctive drip irrigation system permitted as part of on-site treatment systems. The proposed rules would create two new uses: wetlands augmentation and irrigation of food crops and would create two levels of pathogen reduction requirements. Links to the proposed rules and a summary are on the EMC website: <http://h2o.enr.state.nc.us/admin/emc/WQC908AGENDA.htm>.
- Approved asking the EMC to hold public hearings on monitoring rules for animal operations. Links to the proposed rules and an overview of the stakeholder process are on the EMC website.

Water Allocation Committee

- Heard an update on progress toward developing a water quality model to evaluate Progress Energy’s Harris Lake as a discharge site for the Western Wake Water Reclamation Facility. Bill Kreutzberger of CH2MHill told the committee that work so far indicates the lake is phosphorous limited but that an increase in phosphorous caused by the discharge would be offset by increased flushing and reduced residence time. Kreutzberger said that it may be possible to modify the NEPA process to include the Harris Lake discharge and still meet a 2013 construction target. Commissioner David Moreau noted that there is currently no discharge requirement for Harris Lake and expressed concern about a possible reduction in Cape Fear River flow at Lillington with the wastewater discharge directed to Harris Lake. He said a “water balance” is needed to address this possibility.
- Heard from counsel that the Administrative Law Judge hearing the Concord/Kannapolis IBT challenge has extended discovery through spring 2009.
- Heard that the water supply part of the Kerr Lake “216 study” has been eliminated. A “216 study” develops proposals for alternatives to current operation of the reservoir. Under questioning, Jim Mead of the Division of Water Resources (DWR) told the committee that the water supply storage of Kerr Lake is 50,000 acre feet or 15% of the conservation pool and that 58% is not currently allocated. He said that the commanding officer of the Wilmington District of the Corps of Engineers may reallocate up to 15% of the conservation pool without Congressional authorization.
- Heard from Nat Wilson of DWR that generally ground water levels and saltwater intrusion have worsened in the aquifers subject to the Central Coastal Plains Capacity Use Area rules because the withdrawal reduction requirements have not yet gone into effect. However, he said, in some areas in Martin and Lenoir counties where loss of industry has decreased withdrawals, groundwater levels have rebounded, indicating that when the rules do go into effect, recovery will take place.
- Heard from DENR policy analyst Steve Wall about provisions of the “drought legislation”(HB 2499). In addition to measures discussed under the article on legislation, Wall said that the bill also directs the Commission for Public Health to develop rules to authorize the use of “gray water” during periods of drought to hand water trees, shrubs, and inedible plants on single-family residential property.

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September Action *continued from page 9*

On September 11, the EMC took the following action:

- Approved holding public hearings on amendments to the state's ambient air standards for ozone and particulates.
- Approved holding public hearings on temporary rules to amend the NOx SIP (nitrogen oxide state implementation plan) call rules for 2009 and beyond.
- Approved holding public hearings on the triennial review of and proposed changes to groundwater standards. Color-coded charts of 137 proposed standards are available on the EMC website.
- Approved opening a public comment period on reclassification of a section of the Haw River as WS-IV Critical Area for Pittsboro's water supply intake.
- Approved hearing officers' recommendation on response to the Rules Review Commission's objections to the Jordan Nutrient Rules. A chart listing the objections to 15A NCAC 02B .0262 - .0272 and responses can be found on the EMC website. Hearing officer Stephen Smith said that he expected continuing objection to the rules based on lack of statutory authority to require controls on existing development.
- Approved holding public hearings on proposed changes to

rules governing reclaimed water use (NCAC 02T .0900). See discussion above. Dr. David Moreau expressed concern about use of reclaimed water on crops for human consumption and asked that staff "reach out specifically" to the public health community on this issue. Other commissioners asked that the public notice ask for comment on (1) moving the rules from the section titled "waste not discharged to surface waters" to a separate section, (2) kinds and limits of indicator organisms, (3) questions of which system designs must be done by a professional engineer, and (4) indirect water reuse.

- Heard an update on how the EMC coastal stormwater rules are affected by recently passed legislation. Bradley Bennett of DWQ provided a chart showing changes made to the EMC rules by SL 2008-211, which is available at <http://h2o.enr.state.nc.us/admin/emc/documents/AttachmentBCoastalStormwater-ComparisonChart.pdf>. Several commissioners expressed concern about the separation of powers issue raised by continuing rewriting of EMC rules by the General Assembly.

Moreau steps down as EMC chairman

At the N.C. Environmental Management Commission in September, DENR Secretary Bill Ross announced that Dr. David Moreau had notified Governor Mike Easley of his desire to step down as chairman after 16 years in the position. Ross said that the EMC has made astonishing progress over his 16 years and noted, "leadership matters." Moreau will serve the remainder of his term on the EMC.

Governor Mike Easley has appointed commissioner Stephen T. Smith of Raleigh to replace Moreau as chairman.

Data Sources

Division of Water Resources' Water Resources Information, Storage, Analysis, and Retrieval System (WRISARS)

In 2003, the N.C. General Assembly charged the N.C. Drought Management Advisory Council with improving coordination among local, state, and federal agencies, public water systems and water users to improve the management and mitigation of the harmful effects of drought. To comply with this directive and allow for model development and maintenance and management during droughts, the Division of Water Resources pulled together all the various kinds of state water resources data into a system with a common format. This system, the Water Resources Information, Storage, Analysis and Retrieval System (WRISARS), is accessible on the division's website at <http://www.ncwater.org/wrisars/>. With this integrated data set a wide range of tools has been developed and implemented to use and combine current and historical data. The North Carolina Water Resources Map server allows users to query data sets related to weather, streamflow, groundwater, reservoirs, and water use for a number of parameters and display the result in a number of forms, including graphs. Clicking on the water use link takes users to the access point for river basin data where a variety of specialty reports is available.

The site is a collaborative effort between the NC Division of Water Resources, the NC State Climate Office, the US Army Corps of Engineers, the NC DWR Ground Water Management Section, and the US Geological Survey (USGS).

Scientists find high levels of estrogenic activity in swine lagoon effluent

When scientists begin a research project, they have a hypothesis that states what they expect to find. Sometimes they find what they expect, sometimes not. But sometimes, scientists find things that they are not necessarily looking for, and these findings may add a new dimension to their research. That happened to NCSU toxicologist Seth Kullman in the course of his WRRRI-supported investigation of estrogens at swine farms.

Estrogens are steroid compounds that function as the primary female sex hormone. There is growing concern about the health effects on wildlife and, perhaps, humans of increased natural and synthetic estrogen-like compounds in the environment.

Most animals, including pigs, excrete estrogens in waste. When large numbers of animals are confined at one location, large amounts of waste with high concentrations of estrogens can be expected. Elevated concentrations of estrogens have previously been detected in surface waters near swine farms.

To protect against the potential for offsite movement of estrogens from swine waste, it is necessary to know the forms they might take in the environment and how they might be transported. In addition, some types of swine operations may have greater potential for offsite movement of estrogens than others, and to target management measures to the most problematic sites, scientists need to understand any operational factors (such as facility size and stage and number of animals in the reproductive cycle) that might influence generation of total estrogens.

In the latest of many estrogen-related investigations he has conducted, Kullman, whose PhD is in pharmacology and toxicology, and his co-investigators at Duke University set out to fill some of the large data gaps about the fate and movement of estrogens and the operational factors that affect their generation at swine farms.

They sampled lagoons at one farrowing and one feeding operation. Using a genetically engineered yeast, they measured the estrogenic activity of the lagoon samples. They conducted an exposure test to determine if the samples caused reproductive problems in fish. They also took surface water samples upstream and downstream of the swine operations to look for indications that estrogens might be transported offsite in runoff.

As they expected, they found very high concentrations of biologically active estrogens in lagoon samples. Kullman said that perhaps the most important finding to come from the research is that lagoons retain estrogens in their biologically active form.

Also as expected, the investigators found that estrogens extracted from the samples induced production of vitellogenin in male medaka fish. Vitellogenin is a precursor of egg yolk which is produced only in female fish during reproduction. Its presence in males is a strong indication of endocrine disruption.

As expected, they found that chronic exposure of the males

of breeding pairs of medaka fish to one of the estrogens in swine waste resulted in lower numbers of eggs produced, lower percentages of eggs fertilized, and reduced hatching of fertilized eggs.

As they expected, they found measurable concentrations of biologically active estrogens in surface water samples taken near the swine farms that served as their research sites.

But another finding came from an unplanned, spur-of-the-moment analysis of feed used at the farm. "I just happened to be at one of the research sites when feed was delivered. I asked if I could take a sample and then stuck a bucket under the flow going to the storage tank," said Kullman. "We analyzed the sample and found quite a high degree of estrogenic activity that may be due to the presence of phytoestrogens."

Phytoestrogens are non-steroidal plant estrogens similar in structure to 17-beta estradiol, the most potent natural steroidal estrogen. Phytoestrogens are known to have estrogenic effects in humans and animals, and their presence in swine feed introduces one more operational factor to consider in determining the potential for offsite movement of estrogens from swine farms.

Kullman said that one of the potential ways to manage offsite movement of estrogens, is to apply lagoon effluent to crops that take up large amounts of estrogens, such as soybeans. However, when that crop becomes feed for swine, phytoestrogens are being cycled back to farms, adding to the concentration of total estrogens.

Kullman and colleagues have leveraged their WRRRI grant into a three-year, \$663,000 grant from the U.S. Environmental Protection Agency to establish a total facility "estrogen budget" based upon composite measurements of natural estrogenic compounds throughout a swine farrowing operation. That project is just getting started.

Formerly on the faculty at Duke University, Kullman joined the toxicology faculty at N.C. State University last year. His co-investigators on the WRRRI project were Karl Linden and David Hinton of Duke. Linden will also participate in the EPA study along with Kenneth Reckhow of Duke, Michael T. Meyer of the U.S. Geological Survey and Michael Williams of NCSU.

The report based on the WRRRI-supported research, "Bio-analytical Analysis of Natural Estrogens at Concentrated Animal Feeding Operations Affecting North Carolina River Waters," will soon be available.

Upcoming Events

December 8, 2008

NCWRA Forum and Luncheon, 11:30 am
McKimmon Center, NC State University
Raleigh, NC

December 8-9, 2008

NC Chapter, American Public Works Association
Advanced Construction Inspection for Public
Works Workshop
Charlotte, NC
<http://northcarolina.apwa.net/?MODE=EVENTS&id=3730>

January 27-28, 2009

Local Programs Workshop
Pine Needles-Mid Pines Inn and Resort
Southern Pines, NC

February 9-12, 2009

IECA Annual Conference
Reno Convention Center and Atlantis Casino
Hotel
Reno, Nevada
<http://www.ieca.org>

February 16, 2009

NCWRA Forum and Luncheon, 11:30 am
McKimmon Center, NC State University
Raleigh, NC

2009 Spring Erosion and Sedimentation Control Workshops

Dates and Locations TBD
Check WRRRI website for details

February 26-27, 2009

14th International Water Conservation &
Xeriscape Conference
Marriott Pyramid Hotel
Albuquerque, New Mexico
<http://waterconservationconference.org>



NCWRA Luncheon

11:30 am, December 8, 2008

McKimmon Center
NC State University

It Came From Another Continent: Managing Aquatic Invasive Plants

Speakers:

**William Frazier, Water Quality Lab and
Pretreatment Manager, City of High Point
Public Services Dept**

**Robert Richardson, Assistant Professor,
Aquatic and Non-cropland Weed
Management, Crop Science Dept, NC State
University**

Aquatic environments are under attack by a number of different constituents but the most threatening is largely overlooked until it is too late. Both exotic and native plants can consume lakes and streams threatening wildlife and precious water resources. The presentation will provide a basic introduction to the most threatening aquatic plants currently in North Carolina and what is being done to combat them.

This forum will provide 1 PDH (professional development hours) for professional engineers and surveyors, authorized by the NC Board of Examiners for Engineers and Surveyors.

Download a registration brochure (pdf):

[http://www.ncsu.edu/wrri/events/ncwra/NCWRA_
Dec2008.pdf](http://www.ncsu.edu/wrri/events/ncwra/NCWRA_Dec2008.pdf)